

Magnetic Shift Register - a Novel Storage Class Memory

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A proposal for a novel storage-class memory is described in which magnetic domains are used to store information in a “magnetic race-track”. The magnetic race track is comprised of tall columns of magnetic material arranged perpendicularly to the surface of a silicon wafer. The domains are moved around the race-track by current pulses using the phenomenon of spin momentum transfer: experiments demonstrating the current induced moment of domain walls in magnetic nano-wires will be discussed. The domain walls in the magnetic race-track are read using magnetic tunnel junction sensing devices arranged in the silicon substrate. The magnetic shift register promises a solid state memory with storage capacities and cost rivaling that of magnetic disk drives but with much improved performance and reliability.